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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/634,139

08/04/2003

Ilya V. Karpov

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7590

04/03/2006

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EXAMINER

LE, DUNG ANH

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 04/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,139

Applicant(s)

KARPOV, ILYA V.

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-31 and 33-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-31 and 33-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claims 1- 10 and 32 are canceled.

Claims 11, 22, 25 and 31 are amended.

Claims 11- 31 and 33-35 are pending in this application.

Claim Rejections

Set of claims 11- 22

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11- 21 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Moore et al. (6,818,481 B2) in view of Reinberg et al. (6,777,705 B2).

Moore et al. teach a memory comprising: an insulator 13 over a substrate 10, said insulator including a pore 22 having an electrode 31/12 over the substrate and a phase change material 51 over the electrode, wherein the phase change material fills less of the pore than the electrode (col 3, line 20).

Moore et al. do not teach the phase change material including Tellurium.

Reinberg et al. teach the phase change material including Tellurium [0051].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the phase change material including Tellurium in Moore's method because this particular alloy selected should be capable of assuming at least two generally stable states in response to a stimulus, for a binary memory, and capable of assuming multiple generally stable states in response to a stimulus, for a higher order memory. Generally speaking, the stimulus will be an electrical signal, and the multiple states will be different states of crystallinity having varying levels of electrical resistance (col 8, lines 50-60).

Regarding claim 12, Reinberg et al. disclose the phase change material fills less than 25 percent of the pore, the phase change material including Antimony (col 8, lines 40-60).

Regarding claim 13, Moore et al. disclose the phase change material fills about 10 percent or less of the pore (col 3, line 20).

Regarding claim 14, Moore et al. disclose the phase change material 51 is entirely contained within the pore 22.

Regarding claim 15, Moore et al. disclose the phase change material 51 is a chalcogenide.

Regarding claim 16, Moore et al. disclose the phase electrode to act as a heater to heat said phase change material (col 1, lines 55-62-5).

Regarding claim 17, wherein the phase change material is substantially co-planar with the upper surface of said insulator (fig. 5).

Regarding claim 18, Moore et al. disclose a select device coupled to said electrode (col. 3, line 65).

Regarding claim 19, Moore et al. disclose a conductive line 61 formed over said insulator 13 and said phase change material 51.

Regarding claim 20, Moore et al. disclose the phase change material is in contact with said conductive line 61.

Regarding claim 21, Moore et al. disclose the conductive line 61 and the upper surface of said electrode 31/12 are substantially parallel.

Set of claims 22- 24

Claims 22- 24 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Moore et al. (6,818,481 B2) in view of Reinberg et al. (6,777,705 B2).

Moore et al. teach a system comprising: a processor-based device; a wireless interface coupled to said processor-based device; and a semiconductor memory coupled to said device (col 1, lines 35-45), said memory including an insulator 13 over a substrate 10, said insulator including a pore 22 having an electrode 31/12 over the substrate and a phase change material 51 over the electrode wherein the phase change material fills less of the pore than the electrode (col 1, lines 55-65).

Moore et al. do not teach the phase change material including Tellurium.

Reinberg et al. teach the phase change material including Tellurium [0051].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the phase change material including Tellurium in Moore's method because this particular alloy selected should be capable of assuming at least two generally stable states in response to a stimulus, for a binary memory, and capable of assuming multiple generally stable states in response to a stimulus, for a higher order memory. Generally speaking, the stimulus will be an electrical signal, and the multiple states will be different states of crystallinity having varying levels of electrical resistance (col 8, lines 50-60).

Regarding claim 23, Moore et al. teach the phase change material fills less than 25 percent of the pore (col 1, lines 55-65).

Regarding claim 24, Moore et al. teach the phase change material fills about 10 percent or less of the pore (col 1, lines 55-65).

Set of claims 25- 30

Claims 25- 30 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Moore et al. (6,818,481 B2) in view of Reinberg et al. (6,777,705 B2).

Regarding claim 25, Moore et al. teach a memory comprising: an insulator 13 over a substrate 10, said insulator including a pore 22 having an electrode over the substrate and a phase 51 change material over the electrode 31/12, wherein the phase change material is less than 25 percent of the height of the pore (col 1, lines 55-65).

Moore et al. do not teach the phase change material including Tellurium.

Reinberg et al. teach the phase change material including Tellurium [0051].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the phase change material including Tellurium in Moore's method because this particular alloy selected should be capable of assuming at least two generally stable states in response to a stimulus, for a binary memory, and capable of assuming multiple generally stable states in response to a stimulus, for a higher order memory. Generally speaking, the stimulus will be an electrical signal, and the multiple states will be different states of crystallinity having varying levels of electrical resistance (col 8, lines 50-60).

Regarding claim 26, Moore et al. teach the phase change material is about 10 percent or less of the height of the pore (col 1, lines 55-65, col 3, line 20).

Regarding claim 27, Moore et al. teach the phase change material fills less of the pore than the electrode (col 1, lines 55-65).

Regarding claim 28, Moore et al. teach the phase change material fills about 10 percent or less of the pore 22.

Regarding claim 29, Moore et al. teach the phase change material is entirely contained within the pore.

Regarding claim 30, Moore et al. teach a conductive line 61 over said phase change material 51 wherein said conductive line and the upper surface of said electrode 31/12 are substantially parallel (fig. 6).

Set of claims 31, 33- 35

Claims 31, 33- 35 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Moore et al. (6,818,481 B2) in view of Reinberg et al. (6,777,705 B2).

Moore et al. teach a apparatus comprising:

an insulator 13 with a pore 22;

a damascene structure, wherein the damascene structure includes a first electrode 31/12 partially filling said pore over a substrate and a phase change material in said pore 22 over the first electrode, said phase change material 51 filling said pore and arranged at the top of said pore and a second electrode 61 over the damascene structure.

Moore et al. do not teach the phase change material including Tellurium.

Reinberg et al. teach the phase change material including Tellurium [0051].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize the phase change material including Tellurium in Moore 's method because this particular alloy selected should be capable of assuming at least two generally stable states in response to a stimulus, for a binary memory, and capable of assuming multiple generally stable states in response to a stimulus, for a higher order memory. Generally speaking, the stimulus will be an electrical signal, and the multiple states will be different states of crystallinity having varying levels of electrical resistance (col 8, lines 50-60).

Regarding claim 33 , Moore et al. teach the pore and said phase change material have upper surfaces., which upper surfaces are substantially coplanar (fig. 5).

Regarding claim 34, Moore et al. teach the phase change material 51 is in contact with said pore 22.

Regarding claim 35, Moore et al. teach the first electrode is a solid plug 31 (fig. 6).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The central fax phone numbers for the organization where this application or proceeding is assigned are (571)272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE
Primary Examiner
Art Unit 2818

